

weed" is to Mr. Balls a name sufficiently explicit for all practical purposes. He, moreover, manifests a reckless use of terms that often proves most ambiguous if not misleading. The cotton plant belongs, so we are told, to "the sub-order *Gossypiæ* (or *Hibiscæ*)"—there is no such sub-order. Our author next admits that some conception of the genealogical tree of the cotton plant becomes necessary, and hence he affords us a description of what he regards as its original ancestor. He then proceeds to say: "At the present day certain wild cottons are found which represent the descendants of this primitive ancestor not so much altered, such as the wild species *Gossypium sturtii* in Australia." "Not so much altered," and yet the wild species mentioned manifests a direct negation of practically every one of the characteristics of Mr. Balls's presumed primitive ancestor of cotton! It is thus hopeless to attempt to follow him into speculations of "cleavages" that gave rise to his "Asiatic," "Peruvian," and "Uplands" groups. "The grouping," he says, "of all species of cottons of the Peruvian type, for example, into groups of relations, each group being designated a sub-species." By another enigma a sub-species becomes a hybrid.

"The Indian group," we are told, "does not appear to cross with the Upland or Peruvian groups." That statement is given more than once, and its value obviously turns on the plants accepted as Indian, Upland, and Peruvian. It is, however, a fact that a cross has been obtained repeatedly, both in India and America, between an Indian and an American plant.

Why did not Mr. Balls furnish his readers with a botanical drawing of each of the chief plants investigated by him, or at all events with drawings of his three great divisions of which he has so much to say? His plates iii. and iv. are useless for that purpose.

We have felt it incumbent to exhibit the weak side of Mr. Balls's work, but we turn with pleasure to other portions of his book. The chapter on the Egyptian plant (as recognised by the author) is admirable. It sets forth in a vivid manner the different conditions of soil, water, and temperature that prevail in that country. He thus exemplifies the conditions that it would seem must exist before Egyptian stock can be successfully acclimatised in other countries.

The chapter on "Development of the Boll," though full of interesting details, is less practical than it may be presumed the author anticipated it might prove. Mr. Balls's method of investigating (and estimating) the productiveness of the plant, of testing the strength, as also of measuring

the length of the fibre, are certainly clever and seem practical. But his chapter on the "Commercial Lint" confirms the necessity for critical study of all the races of the plant. The appendix affords a very much-needed key to Mr. Balls's methods of research, and is distinctly useful.

PLANT-LIFE IN SOUTH AFRICA AND CALIFORNIA.

- (1) *Plants and their Ways in South Africa*. By Prof. B. Stoneman. New edition. Pp. xii+387. (London: Longmans, Green and Co., 1915.) Price 5s.
- (2) *The Ferns of South Africa, containing Descriptions and Figures of the Ferns and Fern Allies of South Africa*. By T. R. Sim. Second edition. Pp. ix+384. Plates. (Cambridge: At the University Press, 1915.) Price 25s. net.
- (3) *With the Flowers and Trees in California*. By C. F. Saunders. Pp. xii+286. (London: Grant Richards, Ltd., 1914.) Price 7s. 6d. net.

(1) **T**HE author of "Plants and their Ways in South Africa" has produced a useful text-book for the South African student of botany, a companion, that is to say, to class and practical work under supervision. A study of the seed and its germination leads on to the consideration of the growth of roots, stems and leaves, and of the duration of life of the plant. The form and structure of the parts, with a brief section on cells and tissues, is followed by a series of chapters on function. The chapter on the leaf is rather mechanical, and its subject-matter might with advantage have been more intimately associated with the portions dealing with plant-physiology. The study of the flower and fruit is associated with pollination and seed-distribution; and there is a short chapter on the remarkable *Kukumakranka*, a small bulbous plant belonging to the *Amaryllidaceæ*. The remainder of the book, comprising about one-half of the whole, is devoted to a sketch of the classification of plants, mainly the seed-bearing plants, with concise descriptions of those families and their representative genera which occur in South Africa. A short concluding chapter deals with the botanical regions of South Africa. The book is profusely and well illustrated with blocks, both original and borrowed from various sources.

(2) The first edition of Mr. Sim's "Ferns of South Africa" appeared in 1892, and was reviewed in *NATURE* of January 26, 1893. In the twenty-three years which have elapsed since, the exploration of the country north of the Orange, Vaal, and Umvolosi rivers and the opening up of Southern Rhodesia have added greatly to our

knowledge of the fern flora of the reconstituted South Africa. Hence the new edition of the book enumerates 220 species, as compared with 179 in the first edition, and, the author states, this number should be further increased when the northern Drakensberg ranges, the Portuguese mountain slopes, and the valleys of the Zambesi, have been more closely investigated. Mr. Sim has taken the opportunity of revising the nomenclature, which now follows Christensen's *Index Filicum*, and thus renders the volume comparable with recent fern literature. The arrangement adopted by Christensen is also followed in the classification of the ferns proper, that is, exclusive of the Lycopods, Psilotum, and Equisetum.

Of the introductory chapters, that on "Cultivation" has been rewritten and much extended; but there is room for a good chapter on the general life-history of a fern, which is at present somewhat scrappily treated. The plates are more numerous, 186 as against 159, and on the whole better, than in the first edition, and the general get-up of the book, which is now issued by the Cambridge Press, is also greatly improved.

(3) "With the Flowers and Trees in California" is a delightful series of word-pictures descriptive of the plant-life of one of the most brilliantly floriferous regions on the face of our earth. In a series of thirteen chapters, Mr. Saunders describes as many phases of his subject from first-hand knowledge. There is no definite plan, each chapter is complete in itself, and, open it where he will, the botanist or intelligent general reader will find matter of interest charmingly portrayed. The first chapter is retrospective: an attempt to depict the virgin flora as it appeared to the first white men who visited the country, the Portuguese navigators, and later the Padres, who were the earliest settlers. Some account is also given of early botanical explorations, especially of David Douglas, who introduced to European gardens so many Californian flowers and trees; the Yorkshireman, Thomas Nuttall; and the American, John Fremont. The author does not overstate the case when he says that "the value of annuals in horticultural effect was first realised when the Royal Horticultural Society of London sowed the seeds of the scores of beautiful annuals which their collector, David Douglas, back in the 1830's, brought them from California," and "the gardens of Europe are full of California wild flowers, such as clarkias, lupines, gillias, eschscholtzias, godetias, penstemons," and, best known of all, nemophila. Intimately associated with Douglas also are some of the finest conifers, which he discovered in the West American forests, *Pinus lambertiana*, the Douglas pine (*Pseudotsuga douglasii*), and many others.

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The story of Californian plant life would not be complete without mention of the Big trees, and the chapter entitled "The Sequoia and its Adventures in Search of a Name" gives a racy account of the red-wood and its ally, the *Sequoia gigantea*, and the vicissitudes connected with the botanical name of the latter. If California has been generous she has also proved hospitable, and her wayside trees have been brought from all quarters of the globe; one may mention among many various palms, New Zealand cordylines, Australian eucalyptus, acacias, and casuarinas, and the widely-spread pepper-tree (*Schinus molle*), a native of Peru: as "the professor" remarks, "a walk along a California avenue is like a trip round the world." "Tree-hunting on a California desert" depicts another phase, and introduces the reader to the yuccas, mesquit, cacti, and brilliant-flowered shrubs of the desert. A few daintily coloured plates and a number of half-tone illustrations enhance the value of an interesting and eminently readable book.

THE FLY PEST.

- (1) *Fighting the Fly Peril*. A Popular and Practical Handbook. By C. F. Plowman and W. F. Dearden. Pp. 127. (London: T. Fisher Unwin, Ltd., 1915.) Price 1s. net.
- (2) *The House Fly: A Slayer of Men*. By F. W. FitzSimons. Pp. vi+89. (London: Longmans, Green and Co., 1915.) Price 1s. net.

(1) **T**HIS volume is practically an exposition in popular terms of the use of borax as a destroyer of the eggs and larvæ of the house fly, with suitable quotations from Gordon Hewitt and other writers. The use of traps, of formalin, of some general precautions is also advocated. The authors lay stress on the importance of covering manure with soil, but it is not clear how far this will affect its rotting and so its manurial value.

Above all, the authors recommend borax, using the matter in Bulletin 118 of the United States Department of Agriculture and adducing an experiment of their own. We pass over the American bulletin, since it is now recognised in America that borax is not a suitable material for preventing fly-breeding in manure heaps. The "British Experiment" of chapter ix. is of interest, as it goes completely contrary to experiments made in this country on a much larger scale. This experiment was made in three tea boxes, with three cubic feet of manure in each. Flies hatched out from the untreated manure, not from the treated. It is noticeable that flies began to emerge on the eighth day from the untreated manure: they must